

**Holocene Climate Change, Landscape  
Evolution, and Prehistoric Human  
Occupation in the New Hope Tract,  
Sacramento–San Joaquin Delta Region,  
California**

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## **Public Comments**

No public comments were received for this proposal.

# Technical Synthesis Panel Review

## Proposal Title

#0165: Holocene Climate Change, Landscape Evolution, and Prehistoric Human Occupation in the New Hope Tract, Sacramento–San Joaquin Delta Region, California

Final Panel Rating
inadequate

## Technical Synthesis Panel (Primary) Review

### TSP Primary Reviewer's Evaluation Summary And Rating:

This proposed pilot study intends to use a geoarchaeological study to assess past climatic conditions in the upper Delta region and to infer possible future environmental impacts as a consequence of future climatic changes. This would be done by evaluating information from previous geologic and archaeological studies, geologic mapping and subsurface exploration, radiocarbon dating, and analyses of fossils, to assess the nature and timing of climatically driven landscape changes. Although one can agree with the premise that studies of past landscapes can help forecast future landscape drivers, this case is not developed for the particular location proposed. The authors state they wish to "test the hypothesis that the age, nature, and distribution of archaeological sites in the NHT are PARTLY related to changes in the course of the Mokelumne River channel that occurred in response to rising sealevels combined with other largescale Holocene climatic changes". They argue that "climatically driven landscape changes are recorded in the archaeological and geologic deposits of the NHT, which can be used as a proxy to assess future hydrologic, ecologic and cultural impacts to the Delta", but they provide essentially no explanation of how any particular observed landscape changes are to be clearly linked to climatic change or of how any such connection, if

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discovered, is to be interpreted in the context of future conditions. All this change may indeed be recorded in a "rich data set" but the authors do not explain how this will be "used as a proxy for assessing future hydrologic, ecologic and cultural impacts to the Delta." The fundamental objective is not supported or even explained. The proposal received two ratings of EXCELLENT in entirely uncritical reviews. For example: "really good project that will provide important information to planners and managers, as well as provide exceptional paleoclimatic/ paleoenvironmental background for archaeological interests" and "team is good, the goals it has established have excellent intellectual merit, and the project is feasible". The third review gave a rating of GOOD. It found fault in a lack of reference to previous work and in a lack of connection to future climate change. This last reviewer stated: "I think the authors mean to imply that data that is collected for archaeological studies can also be used to answer important questions about climate and landscape changes in the Holocene." This is the only mention in the reviews of what is a very serious flaw in the proposal. The connection to climate change is poorly argued and not at all apparent. In a complex depositional environment such as the proposed field area, the relative position of the shoreline, or the location of archaeological sites, will depend on many factors: water and sediment supply from uplands, sea level change, rates of local aggradation, lateral channel migration, etc. There is no discussion of how the investigators would sort out these various influences in order to determine the effect of climate. Even if the investigators are successful in developing a clear archaeological story, the connection with climate change—the fundamental justification for CALFED funding—is too flimsy to justify the research.

### Additional Comments:

This proposed pilot study intends to use a geoarchaeological study to assess past climatic conditions in the upper Delta region and to infer possible future environmental impacts as a consequence of future climatic changes. This would be done by evaluating information from previous geologic and

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archaeological studies, geologic mapping and subsurface exploration, radiocarbon dating, and analyses of fossils, to assess the nature and timing of climatically driven landscape changes. Although one can agree with the premise that studies of past landscapes can help forecast future landscape drivers, this case is not developed for the particular location proposed. The authors state they wish to "test the hypothesis that the age, nature, and distribution of archaeological sites in the NHT are PARTLY related to changes in the course of the Mokelumne River channel that occurred in response to rising sealevels combined with other largescale Holocene climatic changes". They argue that "climatically driven landscape changes are recorded in the archaeological and geologic deposits of the NHT, which can be used as a proxy to assess future hydrologic, ecologic and cultural impacts to the Delta", but they provide essentially no explanation of how any particular observed landscape changes are to be clearly linked to climatic change or of how any such connection, if discovered, is to be interpreted in the context of future conditions. All this change may indeed be recorded in a "rich data set" but the authors do not explain how this will be "used as a proxy for assessing future hydrologic, ecologic and cultural impacts to the Delta." The fundamental objective is not supported or even explained. The proposal received two ratings of EXCELLENT in entirely uncritical reviews. For example: "really good project that will provide important information to planners and managers, as well as provide exceptional paleoclimatic/ paleoenvironmental background for archaeological interests" and "team is good, the goals it has established have excellent intellectual merit, and the project is feasible". The third review gave a rating of GOOD. It found fault in a lack of reference to previous work and in a lack of connection to future climate change. This last reviewer stated: "I think the authors mean to imply that data that is collected for archaeological studies can also be used to answer important questions about climate and landscape changes in the Holocene." This is the only mention in the reviews of what is a very serious flaw in the proposal. The connection to climate change is poorly argued and not at all apparent. In a complex depositional environment such as the proposed field area, the relative position of the shoreline,

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or the location of archaeological sites, will depend on many factors: water and sediment supply from uplands, sea level change, rates of local aggradation, lateral channel migration, etc. There is no discussion of how the investigators would sort out these various influences in order to determine the effect of climate. Even if the investigators are successful in developing a clear archaeological story, the connection with climate change—the fundamental justification for CALFED funding—is too flimsy to justify the research.

## Technical Synthesis Panel (Discussion) Review

### TSP Observations, Findings And Recommendations:

Two of the three technical reviewers rated this proposal very favorably; however, these reviews provided little detail to substantiate the basis for their ratings. The panel was more in agreement with the more critical review, and had serious concerns regarding the likelihood that the proposed research would be successful in relating the archeological data to climate change. This proposed study would analyze a past Delta landscape to infer its response to climate change. The use of archeological data has considerable potential to contribute to our understanding of climate change, but unfortunately, the proposal did not demonstrate that this could be accomplished in this case. At this site, there are many potential confounding factors that could determine the shifting location of archaeological sites - how would the investigators demonstrate that these shifts are due to climate change? This was the essential flaw of the proposal.

# Technical Review #1

proposal title: Holocene Climate Change, Landscape Evolution, and Prehistoric Human Occupation in the New Hope Tract, Sacramento–San Joaquin Delta Region, California

## Review Form

### Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	<p>The proposal opens with an excellent opening remark, which I take to be a clear statement of the project's main goal (certainly its main theme). Furthermore, it describes a very innovative approach using archaeological data. There are two hypotheses mentioned in the text (on p. 1 and 7). Both principally suggest that human land-use is related to climate-induced prehistoric channel migration. However, it is unclear how these hypotheses relate to the overall goal of predicting "possible future climatic impacts to the CALFED water management program" (p.1). The issue is timely and important in archaeology, but they authors slight other scholars who have engaged in similar research. This leads me to my main problem with the proposal, and that is that they do not cite similar research that has been successful elsewhere. Indeed, the authors state confidently that "the implications of Holocene landscape change have been largely ignored as a reseach problem" (p. 3). This most certainly is not the case, except perhaps in the New Hope Tract, but not elsewhere in the CALFED authority. Geoarchaeological investigations such as these are one of the hottest trends in North American archaeology, and a large number of them have been published in the last 5 years on research in California (e.g. "Geoarchaeological investigations of San Mateo and Las Flores Creeks, California: Implications for coastal</p>
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	settlement models" by Waters, Byrd, and Reddy (1996) Geoarchaeology: An International Journal 14:289-306; and "Coastal paleogeography and human land use at Tecolote Canyon, southern California, U.S.A." by Vellanoweth and Erlandson (2004) Geoarchaeology: An International Journal 19:141-165.). I think the authors should revise their hypothesis to reflect their goal, and also, more thoroughly research similar studies.
<b>Rating</b>	good

## Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

<b>Comments</b>	<p>The project does not directly provide better information about the likely shifts in climate, population increases, and broad land use changes on CALFED actions or expected outcomes, nor answer questions regarding likely scenarios for future changes in climate. I agree with the implication, however, that CALFED decisions are best made with an "understanding of the natural, cultural, and physical processes that have shaped the Delta over thousands of years..." (p. 16). Clearly, well-thought-out studies of Holocene landscape evolution would be advantageous to CALFED planners, but the proposal authors are stretching to justify a comprehensive archaeological study to accomplish this task. There are elements of the proposal that meet this need, and I would suggest that a future revision of this proposal more directly address the issue of climate change. It may, however, be necessary to solicit this proposal to another program that is more directed</p> <p>I think the authors mean to imply that data that is collected for archaeological studies can also be used to answer important questions about climate and</p>
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## Technical Review #1

	landscape changes in the Holocene. This is not only true, but a timely and laudable goal. However, they are pitching some comprehensive new archaeological investigations which may require research designs in their own right. For example, they state that "concern over disturbance of existing cultural remains at the NHT can be addressed and mitigated through the recognition and careful delineation of cultural deposits" (p. 14). What does this mean? Does it mean that archaeological sites will be avoided? Or does it mean that they will be truly "mitigated" through some kind of archaeological testing? If so, then we must also know more about the methods and theories they would employ.
Rating	fair

## Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	This is the strongest part of their proposal. A few brief notes: 1) The tasks really are not sequential, even though they claim them to be. There is no deliverable for task 2, for example. Field proofing the maps generated in TASK 2 are essential to the generation of the maps. I would suggest separating the deliverables from the tasks, and discussing deliverables in a later segment. 2) The pollen study does not seem well thought out. There is no discussion of radiocarbon dates in the core, which will render it useless for this type of study. Focusing and shortening the proposal would help in providing more detailed information about the approaches used in each task.
Rating	very good

## Technical Review #1

### Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?  
Is the scale of the project consistent with the objectives and within the grasp of authors?

<b>Comments</b>	My gut feeling is that the proposed activity is feasible and within the grasp of the authors. But they should not leave it to my gut. A thorough review of the literature for similar studies would demonstrate feasibility. Such a review also demonstrates competence and gives the reviewer the sense that they really understand their discipline.
<b>Rating</b>	good

### Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

<b>Comments</b>	n/a
<b>Rating</b>	excellent

### Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

<b>Comments</b>	Their final deliverables would be a major contribution to our understanding of central California landscape change in the Holocene. In some ways they have undersold their product. I would suggest bumping up the peer-review publication to a major goal rather than an afterthought. Such a study ought to receive international attention, rather than buried in a technical report or in some GIS layers on a
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## Technical Review #1

	CD-ROM somewhere. Presentation at regional and national meetings is not dissemination of results.
Rating	very good

## Additional Comments

### Comments

## Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The project staff are very capable. But, in most cases it was unclear what role each would play. There are exceptions where individuals were mentioned in the proposal text. The proposal would be strengthened if it listed only personnel with a major role in the research. Proposals with more than 5 major personnel listed are hard to evaluate, and it begins to look as if the proposal is being padded. Every participant should have a specific and clear role.
Rating	very good

## Budget

Is the budget reasonable and adequate for the work proposed?

Comments	Seems adequate. The project is very complex; consequently so is the budget. Since the CALFED online application does not really allow for detailed budget description, it may be helpful in the future to put a budget justification into the proposal text. I know that CALFED allows up to 20 pp., but that is
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### Technical Review #1

	excessive. This proposal could be trimmed and improved at the same time, making it possible to include a budget justification.
Rating	very good

## Overall

Provide a brief explanation of your summary rating.

Comments	<p>Ultimately, while this is a great idea, the proposal is not focused and leaves much to be desired. I feel this is an innovative use of CALFED funds. It is not a wasteful or frivolous expense, and I am generally in favor of funding geoarchaeological research. However, I can not enthusiastically support this proposal, which seems to me to need to be more focused, and better researched and planned. I would suggest that they resubmit, having completed their TASK 1 at their own expense to demonstrate feasibility, and also included research showing how similar projects have met with success elsewhere. They should tell you that their primary goal is to provide a peer review publication of their results in a major national or international scientific journal, and that the deliverables will include specific GIS layers and a technical report. They should tell you exactly what will be included in the technical report and what GIS layers will be included. They should also present a better plan for the dissemination of those results. They should also discuss the broader impacts of their research in more detail.</p> <p>I know it is difficult to take criticism of hard work that has been put into a proposal. I hope that the authors will resubmit this proposal to this or another granting agency in the next round, and that my comments will help them make a better proposal with a good chance of funding.</p>
Rating	good

# Technical Review #2

proposal title: Holocene Climate Change, Landscape Evolution, and Prehistoric Human Occupation in the New Hope Tract, Sacramento–San Joaquin Delta Region, California

## Review Form

### Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The purpose of this proposal is clearly presented and is consistent with the goals of CALFED. Understanding the recent geological and paleoclimatic history, including sealevel, is critical to understanding the framework in which CALFED objectives will be pursued.
Rating	excellent

### Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full–scale implementation project justified?

Comments	The proposed efforts build nicely upon prior studies and yet promised significant new results. I wonder how this "pilot project" will be added to in future studies. A bit more discussion on the longer-term goals would have been useful. The conceptual model is good. The hypothesis that the early sites were under water, or buried by riverine deposits will make for interesting prospecting and coring.
Rating	very good

## Technical Review #2

### Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	Very solid work plan is presented. Clearly the investigators know what they are doing. I could quibble and ask about how, specifically, study of the marine microfossils will be used to back out paleoclimatic or paleoenvironmental studies, but I suspect appropriate expertise will be applied. Have the PIs considered not only nitrogen analysis, but also use of nitrogen isotope analysis? This will speak to food web structure, trophic levels, etc. Might be worth investigating.
Rating	very good

### Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	Very feasible. I presume the borehold permits can be secured without problem. True? Disturbance of cultural remains appears to be contained, but you never know, particularly if something unusual or novel is encountered. My sense, however, is that the team is experienced and well trained so this shouldn't jump up and bite anyone.
Rating	very good

### Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

## Technical Review #2

Comments	not particular relevant to this proposed effort
Rating	not applicable

## Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	I liked the data management plans and goals for ensuring access to the data, such as through the <a href="http://www.lettis.com">www.lettis.com</a> website. The value of the data that will be collected should be high and to a wide variety of investigators, and not only those associated with CALFED. I will look forward to seeing the GIS-based maps that will serve as base layers for climate modeling, habitat restoration, etc. The final reports, of course, will be the most important deliverable/product.
Rating	excellent

## Additional Comments

Comments	Nicely integrated team of industry and academia. Proposal is professionally written. Cogent, easy to follow, good ideas.
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## Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	Based on the extensive biographical materials and on knowledge based on conversations with colleagues in UCD, Berkeley, and elsewhere, I have great confidence in the abilities, experience, and knowledge of the assembled team. I like the mix of less experienced and more experienced PIs which speaks to an educational
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## Technical Review #2

	component. Infrastructure is sufficient. All seems "go."
Rating	excellent

## Budget

Is the budget reasonable and adequate for the work proposed?

Comments	Budget seems most reasonable for the proposed effort and scope of work.
Rating	excellent

## Overall

Provide a brief explanation of your summary rating.

Comments	Overall, I'd give this proposal a grade between very good and excellent. If I were able to assess other CALFED proposals, I'd have a better sense of the quality of proposed projects and how this one compares. Regardless, this team is good, the goals it has established have excellent intellectual merit, and the project is feasible.
Rating	excellent



# Technical Review #3

proposal title: Holocene Climate Change, Landscape Evolution, and Prehistoric Human Occupation in the New Hope Tract, Sacramento–San Joaquin Delta Region, California

## Review Form

### Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The goals are clearly stated and internally consistent. This is an important project in that it provides an opportunity to correlate evidence of past climate changes in the region to intervals of significant global changes. The data produced will provide essential information for policy and planning in the region, and ultimately allow managers to predict regional future changes from patterns of the past.
Rating	excellent

### Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full–scale implementation project justified?

Comments	The study seeks to fill a major hole in our knowledge of regional response to climate changes, and will provide an opportunity to evaluate climate changes in the region from the perspective of identifying changes, as well as addressing the rate of change. The model is clearly stated, and the work will provide answers from multiple perspectives (GIS-map layers and paleoclimatic data from cores). The integration of archeology and paleoenvironmental analyses provides a
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### Technical Review #3

	means of assessing the impact of significant global changes on the region's environment and inhabitants.
Rating	excellent

## Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	The approach is grounded in solid scientific practices and should yield data that will assist in planning for the region. The approach is feasible and uses a multi-proxy, inter-disciplinary approach to produce a comprehensive reconstruction of the past. The methodology is reliable and coupled with expert interpretation, will generate a novel product.
Rating	excellent

## Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	The approach is well thought out and relies on the extensive experience of the P.I.'s, as well as complementary experience of associated staff. The time line is appropriate and they should be able to accomplish the goals of the project in the time allotted. The scale is appropriate to the objective. The study employs a range of subtasks well within the areas of the authors expertise that increase the likelihood of meaningful results. There are no predicted obstacles to accomplishing the stated goals.
Rating	excellent

## Technical Review #3

### Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

<b>Comments</b>	
<b>Rating</b>	not applicable

### Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

<b>Comments</b>	The project seeks to develop two overlapping and complementary products: surface maps that rely on soil and archaeological indicators to provide evidence for environmental changes, and subsurface data that expands the project temporally. The maps and data collected will be available electronically, and interpretations of the past environmental changes (both from maps and from subsurface investigations) will be available in the form of reports.
<b>Rating</b>	excellent

### Additional Comments

<b>Comments</b>
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### Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

<b>Comments</b>	The team is well qualified to implement and complete the project. The PIs have extensive experience generating and interpreting maps, particularly with respect to paleoenvironmental analyses of
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### Technical Review #3

	archaeological sites. While they do not have extensive experience working in the subsurface, they have brought on talented PhD's (e.g., Praetzellis, Malamud-Roam, Swers, West) to assist them in interpretation of these cores, and presumably with integration of the subsurface and the surface data.
Rating	excellent

## Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget is quite reasonable, although I am a little confused by the benefits for university employees. It seems as though they are asking for a full summer's benefits but one month's salary. This is a quite reasonable request. The authors note it was difficult to annotate the budget online, and likely this information is available as additional information. The only negative is that I do not see undergraduate and graduate education woven into this budget. I would hope they plan on using this as a teaching experience as well.
Rating	excellent

## Overall

Provide a brief explanation of your summary rating.

Comments	This is a really good project that will provide important information to planners and managers, as well as provide exceptional paleoclimatic/paleoenvironmental background for archaeological interests. The only issue that I have with this proposal is the lack of student involvement. I recommend funding but with the expectation that undergraduate and graduate students will be involved.
Rating	

Technical Review #3

<b>excellent</b>
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